6.

Salt-Water Sweetned;

Or, a TRUE

ACCOUNT

OF THE

Great Advantages

Of this NEW

INVENTION

BOTH BY

Sea and by Land:

TOGETHER

With a Full and Satisfactory Answer to all Apparent Difficulties.

ALSO THE

Approbation of the COLLEDGE of PHYSICIANS.

LIKEWISE

A LETTER of the Honourable *Robert Boyle* to a Friend upon the same Subject.

LONDON: Printed for *Will. Cademan*, at the *Popes-Head* in the *New-Exchange* in the *Strand*. MDCLXXXIII.

TO THE KING'S Most Excellent Majesty

SIR,

WHen Mr. *Boyle*, with my Partners, and my self attended your Majesty with the Experiment of Reducing *Salt Water* into *Fresh*; your Majesty seem'd so well pleas'd with an Invention of that Universal Benefit, That We cannot but with our Humblest Duty, acknowledge your Garcious Reception of it; However as your Great Wisdom, and Judgment is not easie to be surpriz'd, and your Royal Approbation never known to be your hasty Act of Grace; your Favour and Patronage was not fully obtain'd, till with the strictest Scrutiny you had first examin'd those Hopes and Probabilities, you vouchsaf'd to Encourage in Us.

But when upon further conſideration, We had obviated all Difficulties, and ſalv'd all Objections againſt this Undertaking, (which We hope will appear in this Printed Paper,) your Majeſty was Graciouſly pleas'd to give us your Approbation, and to Order Us your *Letters Patents*, which Grace and Favour, ought to be, and is receiv'd by Us with the deepeſt ſence of our humble Acknowledgements and Gratitude.

And if the Fruits of your Royal Grant has not hitherto been deriv'd to Us, 'tis partly by ſome Obſtacles we met from the ſuggeſtions of a private Perſon, but more eſpecially by the late *Horrid Conſpiracy*, when, not only our Loyal apprehenſions for your Majeſties Danger, diverted our Thoughts from all other Concerns, but likewiſe we judg'd it a part of our Duty not to be preſſing on your Majeſties Goodneſs, or on your Miniſters of State in ſo Important a juncture of Affairs: But having now re-gain'd Leiſure & Freedom after the diſſipation of the greateſt part of our Fears, We preſume a ſecond time to lay theſe Endeavours at your Feet, as beſt Entituled to the Patronage of ſo great an Undertaking by your own Subjects, and beſt able to Recommend it to the World by your Royal Approbation.

This Experiment is in a great degree owing to the Eminent Mr. *Boyle*, and indeed well worthy ſo Ingenious

Ingenious a Promoter, being ſo much the more the Favourite of his happy *Genius*, as it is Univerſally uſeful to Mankind; But what ever Advantages this Country, or indeed the World may receive by it, his whole ambition is bounded in the publick profit, contenting himſelf with no other Benefit from it, than the ſatisfaction and pleaſure of ſeeing it accompliſh'd by his Friends.

The Advantages in regard to *Navigation*, eſpecially in long Voyages, which are ſubject (through often Calms, and on ſeveral other accounts,) to diſtreſs for want of Water, and the benefits to Sea-Towns, which are incommodated by Brackiſh Waters, Together with the Eaſineſs, Cheapneſs and Wholſomneſs of this prepared Water, are the principal ſcope of theſe enſuing Papers, which are Humbly Dedicated to your Majeſties Peruſal, Favour, and further Approbation by,

Your Majeſties moſt Dutiful, and

Obedient Subject,

R. FITZGERALD.

The fore-going Dedication Humbly offered to His Majesty, *having discovered the Intention of this Undertaking; it remains now to satisfy all Reasonable Scruples which have been raised concerning the Wholesomeness and Cheapness of* Water *thus Prepared.*

The *Queries* and *Answers* follow.

Quest. 1. IF *this* Water *can be made in sufficient quantities to serve the Uses of any Ship at* Sea?

Ans. About Ninety Gallons may be Prepared in every Twenty Four Hours by an Instrument of 33 Inches Diameter, which will stand under the Deck of any Ship; and it's computed that less than 3 Quarts is a good Allowance for any man in that time: And if a large Ship, wherein there are many men abroad, should require more Water, then two or more of the Instruments may be had upon Reasonable Terms, and one man may attend several of them.

Quest. 2. *In case the Operation be by* Fire, *it may require a Skilful* Chymist, *or one known in such Operations to be on Board every Ship, who will require great Wages?*

Anſ. There will be no occaſion for any ſuch perſon, for any Sea-man may be Inſtructed in an Hour or two to Prepare this Water.

Queſt. 3. *It's probable that the* Engine *may be frequently out of Order, and being ſo at* Sea *where Artificers and Tools are wanting to Repair it, there muſt neceſſarily follow want of* Water, *which will be of Ill Conſequence?*

Anſ. This *Engine* is of ſuch Contrivance, that it's never likely to be out of Order.

Queſt. *Can this* Engine *be of uſe in Stormy-weather?*

Anſ. Since a ſufficient quantity of Freſh-water may be ſo eaſily had by this *Engine*, the Mariners will be Careful to make a good Proviſion of it before-hand; however 'tis not to be doubted but it will anſwer the worſt Accidents of the greateſt Storms, and have its Effect ſufficiently in the worſt Weather, eſpecially conſidering that in ſuch deſperate Extremities men muſt be content with ſmaller Allowances.

Queſt. 5, *The Operation being by* Fire *it may endanger the Ship, and the Smoak be very offenſive?*

Anſ. The *Engine* may eaſily be placed in any Ship without danger of *Fire*, or offence of Smoak.

Queſt. 6. *Will not the Charge of this Inſtrument and the Materials belonging to it be very great?*

Anſ. It is difficult to make exact Anſwer to this, but an Inſtrument of the largeſt Size, with all the Materials belonging to it, will not amount to above Sixteen Pound at moſt, and may laſt many years, and accor-

ding

ding to the Rates of Ships they may be proportion'd both in Bulk and Price.

Queſt 7. *Will not the Fewel be very Chargeable, and take up much Room in the Ship?*

Anſ. This Operation is cauſed by ſo little *Fire*, that it will be very Cheap, and the Proviſion need not be great, nor the trouble of Stowing it in a Ship.

Queſt. 8. *Will not the Ingredients take up much Room, and be very Chargeable.*

Anſ. A Veſſel leſs than a Barrel may contain enough of the Ingredients to carry a Ship to the *Indies* and back again; and the Ingredients for one hundred Gallons of this *Sea-Water* will not amount to above Fourteen Pence at moſt.

Queſt. 9. *Admitting this Preparation of Water may be made, and in ſufficient quantities, it may be doubted whether it be wholeſome?*

Anſ. The Famous Lord *Bacon* having written Learnedly of this Subject, had not the leaſt thought that the Sea-water after it had been Diſs-ſalted, without any Noxious addition, was Unwholeſome, and it neither now is, nor ever was really doubted whether it were Wholeſome: However, becauſe invidious perſons, who are no well-wiſhers to Ingenious Deſigns, may poſſibly raiſe Scruples, the Gentlemen who are concerned in this Grant, have purpoſely to give Publick Satisfaction, ſent a large quantity of this Water to Doctor *King*, a very Ingenious Phyſician, who is a Member of the *Colledge*, and of the *Royal Society*, who finds.

 1. That

1. That it is Lighter than moſt of the Waters about the Town.

2. That it is without Sediment and Tranſparent as any other Waters.

3. That it Lathers, (as they call it,) with *Waſh-Ball* or *Soap*, better than other Water, and with leſs *Soap*.

4. That *Sugar* diſſolveth ſooner in it, than in other *Water*.

5. That it *Evaporates* ſooner than common *Water*.

6. That whereas common *Water* Putrifies, and yeilds a Stinking Smell within a few Weeks, this has continued Sweet and unaltered ſeveral Months, and may yet do ſo much longer, being ſtill in as good condition as it was above four Months ago.

7. That it makes *Gellies* as firm and good as any *Water*.

8. That it Boils Peaſe to Tenderneſs, Beef, Mutton, Fiſh, and all other Meat, without giving it an ill *Taſte* or *Colour*.

9. That it has no kind of ill *Taſte* in it ſelf, and Boils in *Milk* without Curling.

10. That *Flowers*, *Plants*, and all *Vegetables* grow in it at leaſt as well as any other *Water*. And that ſmall *Animals* Live and grow in it.

Several men of great Quality, *viz*. The Earls of *Shrewsbury*, *Weſtmorland*, *Mulgrave*, the Lord *Dunbar*, Lord *Lumley*, Lord *Falconbridge*, and Lord *Chumley*, beſides ſeveral Gentlemen of Quality, Officers of *Sea* and *Phyſitians* have *Drunk* of this *Water* without being

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in the leaſt indiſpos'd after it; but leſt any doubts may remain, after this of the *Salubrity* of the ſaid *Water*, the following Teſtimonial of theſe Learned and Eminent *Phyſicians* is here inſerted.

The Approbation of the Colledge of Phyſicians, *and of other* Doctors *of* Phyſick, *Practiſing in and about* London.

WHereas we have received an account in a *Gazet* publiſhed ſome months ſince, that the Honourable *Robert Fitz-Gerald* Eſq; hath found out the way and means of reducing *Salt-water* into Freſh, in quantities ſufficient to ſerve Ships at Sea. And forasmuch as ſome perſons may poſſibly make a doubt, if the ſaid Water be wholſome after the Salt is taken out of it. We therefore conſidering of what general advantage, this uſeful Experiment may be, having fully inform'd our ſelves from Mr. *Boyle*, that the ſaid Experiment is made by Fire. And having alſo ſeen an account of ſome Experiments made by ſome Members of our own Body to declare Our opinion, that We believe the ſaid Water is very wholſome, and may be ſafely us'd. And being further acquainted by the ſaid Mr. *Boyle*, that the very few Ingredients made uſe of in the ſaid Operation, are fix'd in the Fire, and give no noxious quality to the Water; We are therefore of Opinion that the ſame may be ſafely us'd, and is at leaſt as Healthy

as

as any other Water us'd at Sea. All which We certify (at the Requeſt of the Honourable *Robert Fitz-Gerald.*)

Dr. *Cox* Preſident,
Sir *C. Scarborough* Knt.
Dr. *Daniel Whiſtler*,
Dr. *Weatherly*,
Dr. *Will Denton*,
Sir *T. Millington* Knt.
Dr. *Walter Needham*,
Dr. *Thomas Short*,
Dr. *Thomas Allen*,
Dr. *Edmond Dickingſon*,
Dr. *William Croone*,
Dr. *Richard Lower*,
Dr. *John Windebank*,
Dr. *Daniel Cox*,
Dr. *James Rupine*,
Dr. *Charles Conqueſt*,
Dr. *Edmond King*,
Dr. *Willoughby*,
Dr. *Thomas Sydenham*,
Dr. *Edward Tyſon*,
Dr. *Nehemiah Grew*,
Dr. *David Abercromby*.
Dr. *Andrew Creagh*,

Though Phyſick has always Flouriſhed in this Kingdom, yet in this Age it is in greater perfection than ever; being improv'd both as to the Practical and Speculative part, by the preſent Fellows of the Famous Colledge of Phyſicians; who being Men of great Practice and Eminent Learning, cannot but give full ſatisfaction to all ſuch as inquire concerning the healthfulneſs of this Water, Their Opinion being in this particular, the more valuable, becauſe it is Their own diſadvantage; ſince the Brackiſh Waters of the Sea-Coaſt, and the putrifyed Waters made uſe of at Sea, might probably have afforded them a great number of Patients, which may hereafter be leſſened by the uſe of this wholſom Water.

The

The Benefits and Advantages of Sea-Water *made* Freſh.

MUch Stowage will be ſaved, ſo that a Ship of 50 or 60 Tun and proportionably of greater Bulk may take in ſeveral Tuns of Goods more than they formerly uſed to carry; which will conſiderably advance the Trade of all Merchants, and be of vaſt profit to the Maſters or Owners of Ships.

The Charge of Casks is very conſiderable, eſpecially when bound with Iron, as all Sea-Casks muſt be; And by means of this Engine, three fourths of that charge will be ſaved.

The tear and wear of Boats often going from Ship-board, and frequent loſs of the Boats and men in Stormy weather, and the opportunity of the Sea-mens being Drunk on ſhoar; by which many fatal accidents do happen,(by means of having this Water-Engine)will be prevented.

Ships in long Voyages have been forc'd to run many Leagues from their intended courſe, which much retards their Voyage, and makes them loſe fair winds, and maintain more Sea-men at charges of Diet and Wages than they have occaſion for; which inconveniences may be prevented by having water within themſelves.

Ships are often forc'd to leave their Ankors and Cables behind them, by being forced into dangerous Shoars upon account of taking in Freſh water.

In the *African East* and *West India* Voyages, great quantities of Fresh water are necessary, which the Seamen are forc'd to put above Deck for want of room, which is great hindrance to a Ships Sailing, & much endangers & weakens a Ship in case of Calms, which often happen in the narrow Seas, but especially near the Line, this Instrument will be of vast Advantage by affording fresh and wholsom Water, instead of that which is unwholsom & offensive.

Essex, *Kent*, and all other the Sea Coasts, that want wholsome Water, may be easily and cheaply supplyed by this means; as also *Venice*, *Amsterdam*, *Roterdam*, and all other places that lye near the Sea, and either want good, or have Brackish Water.

In time of war, whole Navies may be relieved by this Engine, and opportunity given of making the greatest discoveries imaginable.

It is further to be considered, that hitherto the richest and ablest bodied Sea-men have been averse from undertaking long Voyages by reason of endangering their healths, and lives, by making use of putrified Water, which inconvenience is not now to be feared there being such useful hopes of Fresh Water by the use of this Engine, and possibly a smaller number of men may serve the use of Ships then do at present, by which much Charges will be saved to the Masters and Owners of Ships; and Merchants may Trade upon easier Terms.

A LETTER of Mr. *BOYLES*, to the Learned Dr. JOHN BEALE Fellow of the *Royal Society*, concerning *Freſh-water* made out of *Sea-water*, Printed at the deſire of the *Patentees*.

SIR,

TO give you a ſhort account (ſuitable to the little time I have to do it in,) of the Tranſaction, which I ſuppoſe muſt have given the riſe to the mention made of my Name in the publick Gazet; *I muſt inform you, that one of my neareſt Relations,* (Captain Fitz-gerald,) *and ſome other Worthy Gentlemen, having acquainted His Majeſty, that They had an Invention for making* Sea-water, *ſweet and wholſom in great quantity, and with ſmall Charge, and that I had examin'd, and did approve the Water ſo prepar'd; His Majeſty was pleas'd with very Gracious Expreſſions, to command Me to attend Him, with a further and more particular Information. Having readily obey'd this Order, and been made acquainted with the Objections the King thought fit to make againſt the Practicableneſs of the Invention; which, (tho a private Man had urg'd them,) I ſhould think the moſt Judicious that have been fram'd againſt it, I Humbly repreſented to him,*

that I look'd upon this Invention as Comprizing two differing things; *a* Mechanical *part, which related to the Engine it ſelf, and the uſe of it a Ship-board, and a* Phyſical *part which concerns the Potableneſs and Wholſomneſs of the Liquor. About the former of theſe I did not pretend to clear the Difficulties, eſpecially ſuch ſtrong ones, as His Majeſty had propos'd; but left it to the* Patentees *to give Him Satisfaction, which they were in a readineſs to offer. But as to the Wholſomneſs of the prepar'd Water, I had made ſome Tryals upon that Liquor, which gave me no juſt grounds of ſuſpecting it to be unwholſome, but ſeveral motives to believe it well condition'd, and of great uſe to* Navigators, *and not to them only. And having hereupon briefly acquainted His Majeſty with the chief Tryals I had made to examine this* Sweetned Water, *He was pleas'd to look upon them as Satisfactory, and vouchſaf'd on that occaſion to diſcourſe as a* Virtuoſo *of the Sea and Brackiſh-Waters, and gave me ſome new, as well inſtructive Obſervations about them: and in concluſion, diſmis'd the* Patentees *with a Gracious Promiſe of His Royal Protection, and peculiar Favour.*

To this ſhort Narrative it now remains, that I briefly Subjoyn the chief things that perſwaded me of the Salubrity of this Water, whence may be juſtly and eaſily inferr'd, the Utility the Publick may receive by a cheap and eaſy way of preparing it.) Firſt, *then I conſider'd that almoſt all the Rain-water that falls from the Clouds on the Main Ocean, and which (except perhaps in very few places in torrid Climates)*

is

is unquestionably receiv'd as wholsom, must be afforded by the Sea, and consequently be but Sea-water free'd from its Salt (*according to the Famous Motto,* Redit Agmine dulci) Next *I found,* (*as His Majesty Himself had done,*) *that the Liquor was well tasted, and without any sensible Brackishness; and so some of it continued for between* 4 *or* 5 *Months in a large Crystal Bottle, that I purposely kept un-stopt, and for the most part in a* South *Window, where it neither did, nor probably in a long time, will putrifie, or so much as appear troubled or less transparent; during which time it was with Approbation tasted and smell'd by several Learned Physicians of the Famous Colledge of* London. Thirdly, *I found it lather very well, which most Pump-waters, and many others that have some little* (*tho' unperceiv'd*) *common Salt in them, will not do.* Fourthly, *this Water will boyl Pease tender, which amongst Seamen is one of the principal signs of good Water.* Fifthly, *In very good Ballances with an Instrument that I purposely caus'd to be made for the nice weighing of Liquors, I found this Water far less heavy than one would expect, for if it differ'd at all in weight from the like quantity of undistil'd Water,* (*I speak with an* If, *because it is far more difficult to be exact in such nice Tryals, than the unpractic'd will imagine*) *the difference was not considerable, being but* 1 *part in* 400; *and that difference is very small in comparison of that which* Navigators *and Learned Authors relate to be observable in natural Waters, all of them good and potable: I might tell you on this occasion; that the last great* Duke

of

of Tuſcany, *who was an Eminent* Virtuoſo, *and the* Patron *of the Celebrated* Academy *of the* Lyncean Philoſophers *is affirm'd among other prudent courſes that he took for his Health, whereof he was very Solicitous to have conſtantly made uſe of Diſtill'd Water for his own Drinking. And I could add other things favourable enough to the* Patentees *Water, if Haſte, and perhaps Diſcretion too, did not oblige me to leave them yet unmention'd, that I might now have time to ſay ſomewhat of the main thing of all that convinced me of the* Saltleſſneſs *of the Water I ſpeak of. I conſider'd then,* Sixthly, *That the thing that was aim'd at by thoſe Ingenious men, that at differing times, and in ſeveral Countries have attempted to make Sea-water Sweet, and the thing that was requir'd by propoſing Recompences, or otherwiſe to Encourage the Makers of ſuch Attempts, was to Free the Sea-water from the Brack-ſhneſs without any Noxious Additament: ſo that on all ſides it was taken for granted, that the only thing that kept the Sea-water from being ſafely Potable, was its Brackiſhneſs. From which Reflection it was natural for Me to infer a Concluſion very favourable to our prepar'd Water: For having long ſince written a ſhort Diſcourſe of the* Saltneſs of the Sea; *I had been Induſtrious to deviſe ways of comparing Waters in point of Brackiſhneſs. And by theſe I found the* Patentees *Water to be more free from Common-ſalt, than Waters that are uſually Drunk here in* London, *of which I remember I ſhew'd thoſe Gentlemen an Experiment that ſurpriz'd as well as convinc'd them. And that which more ſa-*

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tisfi'd me my ſelf, was a Tryal that I carefully made by a way which having m ntion'd, but not yet (for want of opportunity diſclos'd to His Majeſty, the Reſpect I owe Him forbids me to impart without His leave: On which account I hope you l be content to be at preſent aſſur'd, of theſe two Things; One, that by this way of Tryal, I found, (what poſſibly you will think ſtrange;) that if there were in Water, ſo much as one Grain of Salt, in above two Ounces of Water, I could readily diſcover it: The other, that even by this Critical Examen, *I could not detect ſo much as a Thouſandth part of Salt in Our Prepar'd Water; whereas I found by Tryals purpoſely and carefully made, that our* Engliſh *Sea-Water contain'd a 44, or 45th. part of good dry Salt; or, which is all one, that 44 Pints, or near ſo many Pounds of* Marine *Water, would yield about one Pound of dry Common-Salt.*

Thus Sir, *you have a ſhort and Art-leſs Account, ſuch as my haſt will permit, and the nature of the Subject requires, of my part in promoting this Profitable Invention; to which I own my ſelf a great well-wiſher, not out of any private Intereſt (tho that was obligingly proffer'd me by the* Patentees,) *but as I think the bringing it into general uſe may prove a real Service to Mankind, upon the Score of divers Utilities and Advantages, which yet, (tho I had leiſure,) I ſhould think very needleſs to enumerate to ſo diſcerning a Perſon as* Dr. B. *to whom I ſhall therefore haſten to Subſcribe my ſelf, &c.*

An Affectionate Freind and Servant
R. Boyle.

The

THe Gentlemen Concern'd in this Grant, are the Honourable *Robert Fitz-Gerald*, Collonel *Oglethorp*, Mr. *Bridgeman*, Mr. *Thomas Maul*, and Mr. *Patrick Trant*, who intending the General Good as well as their Private Advantage in this Deſign, do intend as ſoon as theſe Papers be made publick, to agree with all ſuch as are willing to deal with them for the Inſtruments and Ingredients; which concerning ſo nearly the Lives and Healths of men, ſhall be carefully made up under ſuch ſure and private marks, that it ſhall be very hard (if poſſible) to Counterfeit them.

If any Corporation, Body of People, or Private Perſons, are willing to be concern'd herein, they may pleaſe to direct their Letters to any of the Patentees before-mentioned, at *Garaway's Coffee-houſe* over againſt the *Royal-Exchange*, or at *Will's Coffee-houſe* in *Bow-ſtreet* in *Covent-Garden*, or to Mr. *John Pye* in *Brook-ſtreet* near *Holbourn*, who is the Perſon appointed by the Patentees to receive ſuch Papers as are intended for them.